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Patent  
Case No.: 55814US004**RECEIVED**  
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MAR 29 2004

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First Named Inventor: CHOU, YEUN-JONG  
Application No.: 09/954751 Group Art Unit: 3723  
Filed: September 18, 2001 Examiner: Rachuba, Maurina T.  
Title: UNITARY BRUSH HAVING ABRASIVE COATED BRISTLES  
AND METHOD OF MAKING THE SAME

**AMENDED BRIEF ON APPEAL**

Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

**CERTIFICATE OF TRANSMISSION**

To Fax No.: 703-872-9306

I hereby certify that this correspondence is being facsimile  
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Date

Signed by: Richard Francis

Dear Sir:

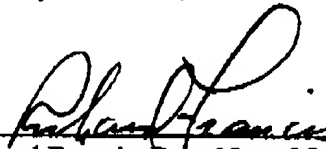
This responds to the Office Action mailed March 19, 2004. The Examiner has indicated that the Brief filed on March 8, 2004 is defective because it does not contain a concise explanation of the claimed invention, referring to the specification by page and line number and to the drawing, if any, by reference characters (37 CFR 1.192(c)(5)).

Applicants submit herewith an amended Brief which includes additional detail in the explanation of the invention which specifies the page and line number of the specification. It is presumed that no additional fee is required for the amended Brief, but if a fee is required, it may be deducted from Deposit Account No. 13-3723.

Respectfully submitted,

March 29, 2004  
Date

By:

  
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3M Innovative Properties Company  
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March 29, 2004	
Date	Signed by: Richard Francis

Dear Sir:

This is an appeal from the Office Action mailed on October 24, 2003. This Brief is being filed in triplicate. The fee required under 37 CFR § 1.17(c) for the appeal should be charged to Deposit Account No. 13-3723.

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Application No.: 09/954751Case No.: 55814US004**REAL PARTY IN INTEREST**

The real party in interest is 3M Company (formerly known as Minnesota Mining and Manufacturing Company) of St. Paul, Minnesota and its affiliate 3M Innovative Properties Company of St. Paul, Minnesota.

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**RELATED APPEALS AND INTERFERENCES**

Appellants are unaware of any related appeals or interferences.

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**STATUS OF CLAIMS**

Claims 1 and 3-13 stand finally rejected by the Office Action mailed October 24, 2003. This rejection was maintained in the Advisory Action mailed January 21, 2004. Claims 1 and 3-13 stand finally rejected under 35 USC § 103(a) as being unpatentable over Johnson, et al. (US Patent No. 5,679,067) in view of Barber, Jr., et al. (US Patent No. 5,518,794).

Claims 14-16 have been withdrawn from consideration because of a restriction requirement. Claims 1 and 3-13 are set forth in the APPENDIX.

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**STATUS OF AMENDMENTS**

No amendments have been filed after the final rejection.

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**SUMMARY OF THE INVENTION**

The invention is an abrasive article. The abrasive article, as defined in claim 1, is as follows:

1. An article comprising:
  - (a) a unitary brush comprised of a hub or body and bristles which are attached to the body or hub and are formed of the same mass of material as the hub or body without adhesive bonding or mechanical fastening of bristles to the hub or body, the brush having a plurality of bristles, each bristle having a surface;
  - (b) a first coating of adhesive over at least a portion of at least some of the bristle surfaces; and
  - (c) a plurality of abrasive particles secured to at least a portion of at least some of the bristle surfaces via the first coating.

As shown in the drawings, Fig. 1a illustrates a front plan view of an embodiment of an article of the invention, as explained in the specification on page 10, line 30 to page 11, line 4. Fig. 2 is a radial brush which comprises a central hub 3 having bristles 4 extending radially therefrom, as explained on page 11, lines 5-6. Bristles 4 have abrasive particles 6 adhered thereto via a first coating 8, as shown in detail in Fig. 1b, as explained on page 10, line 30 to page 11, line 4.

The invention provides a unique way of providing a unitary brush which does not require assembly of filaments to a preformed hub because the filaments and the hub are a unitary assembly. The invention provides an abrasive article which has exceptional abrasive performance when compared to conventional, commercially available abrasive articles and wire brushes. Test results, as shown on page 15, lines 8-10, in Table III, reveal that the brush, according to the invention, removes paint at a high rate without surface loading the abrasive article with the paint being removed. The abrasive article is conformable and demonstrates an excellent paint removal rate.



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**ISSUES ON APPEAL**

1. Would one skilled in the art combine the teaching of Johnson, et al. (US Patent No. 5,679,067) with that of Barber, Jr., et al. (US Patent No. 5,518,794) under 35 USC § 103(a)?
2. Does the combination of Johnson, et al. (US Patent No. 5,679,067) and Barber, Jr., et al. (US Patent No. 5,518,794) teach the claimed invention as defined in Appellants' claims 1 and 3-13 under 35 USC § 103(a)?

Application No.: 09/954751Case No.: 55814US004**GROUPING OF CLAIMS**

The appealed claims will stand or fall together. No admission, however, is being made with respect to the obviousness of the subject matter of the dependent claims with respect to the subject matter of the independent claims.

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**ARGUMENTS OF APPELLANTS**

***Issue 1*** *Would one skilled in the art combine the teaching of Johnson, et al. (US Patent No. 5,679,067) with that of Barber, Jr., et al. (US Patent No. 5,518,794) under 35 USC § 103(a)?*

In rejecting claims 1 and 3-13 under 35 U.S.C. § 103(a), the Office Action indicates that Johnson, et al. ('067) discloses a molded abrasive brush having a backing with a plurality of bristles extending therefrom, the backing and bristles being integrally molded (Abstract). The Office Action further indicates that Barber, Jr., et al. ('794) shows in Fig. 4, a unitary brush, but not a brush with the bristles molded from the same mass of material. The Office Action further indicates that it "would have been obvious to one of ordinary skill to have provided '067 with the first and second coating of adhesive and abrasive coating, as taught by '794, column 1, lines 39-47 to prevent the bristles from taking a set shape, softening and losing its effectiveness." (Office Action mailed October 24, 2003, page 3.) It is submitted that this conclusion is only made by hindsight reasoning and is contrary to the teaching of each of these references.

It is submitted that one skilled in the art would not combine Barber, Jr., et al., and Johnson, et al. to arrive at the claimed invention. Barber, Jr., et al.'s invention deals with formed filament cores that are coated with molten thermoplastic elastomer (TPE) which contains abrasive particles to provide abrasive coated filaments. The abrasive particles may be applied to a coating of the TPE coated core by projecting abrasive grains toward the TPE-coated pre-formed core but that is not Barber, Jr., et al.'s preferred method of making the coated preformed core filaments. See, for example, column 22, lines 7-14:

Abrasive particles may be applied to a TPE-coated core by projecting the abrasive grains toward the TPE-coated preformed core by force, such as electrostatic force. However, the preferred method is the first mentioned one, wherein one or more preformed cores are passed through a die which at least partially coats the preformed cores with molten, abrasive-filled TPE, and the molten TPE cooled to form the hardened composition.

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Rather than forming abrasive brushes with a preformed core which includes filaments made of the same mass of material as the core, Johnson, et al. incorporate the abrasive filaments into an abrasive brush, for example, as noted in column 21, lines 49-62:

The composite abrasive filaments of the invention can be incorporated into brushes of many types and for myriad uses, such as cleaning, deburring, radiusing, imparting decorative finishes onto metal, plastic, and glass substrates, and like uses. Brush types include wheel brushes, cylinder brushes (such as printed circuit cleaning brushes), mini-grinder brushes, floor scrubbing brushes, cup brushes, end brushes, flared cup end brushes, circular flared end cup brushes, coated cup and variable trim end brushes, encapsulated end brushes, pilot bonding brushes, tube brushes of various shapes, coil spring brushes, flue cleaning brushes, chimney and duct brushes, and the like. The filaments in any one brush can of course be the same or different.

No mention is made in Barber, Jr., et al. of the type of unitary brush defined in the claims of the present application.

Johnson, et al. would not want to make a brush by the method described in Barber, Jr., et al. On the contrary, Johnson, et al.'s method of making a brush is described in the paragraph bridging columns 3 and 4 as follows:

The present invention also includes a method of making a molded abrasive brush. The method comprises the steps of: a) mixing a moldable polymer and abrasive particles together to form a mixture; b) heating the mixture to form a flowable material; and c) injecting the flowable material under pressure into a mold to form an abrasive brush, wherein the brush comprises: a generally planar flexible base having a first side and a second side, and a plurality of bristles have an aspect ratio of a least 2 and are integrally molded with the base. In another aspect of the inventive method, step a) comprises mixing a thermoplastic elastomer with abrasive particles. In a further aspect of the inventive method step a) further comprises mixing a lubricant with the mixture.

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As can be seen, Barber, Jr., et al.'s method of making brushes and Johnson, et al.'s method of making brushes are different and incompatible with each other and with that claimed in the present Application. The Office Action indicates that the claims are not claiming a method, but a product produced by the various methods. Each of these methods would result in products which differ from one another. Johnson, et al. make abrasive coated bristles which would have to be cut and assembled into a brush. Barber, Jr., et al. mold a brush with abrasive particles within the filaments, not coated on their exterior. Appellants make a brush which has filaments attached to the hub in a unitary arrangement without adhesive or mechanical bonding and the filaments are coated with a coating that bonds abrasive particles to their surface. Each of the methods produces a completely different product. Claim 1 defines a product, an abrasive article, that reflects the selection of the hub with integral filaments that are coated with an adhesive which holds abrasive particles to their surface. The Examiner's statement at pages 2 and 3 of the Advisory Action mailed January 1, 2004 is based solely on hindsight reasoning. The Examiner's statement speculates as follows:

Johnson et al disclose an abrasive brush comprising abrasive bristles which are integrally molded with the base of the brush, the bristles having abrasive interspersed throughout. Johnson et al do not teach that the abrasive is not interspersed but coated onto the outer surface of the bristle. Barber, Jr. et al teach in an abrasive brush, providing preformed bristles which are coated with abrasive. Barber, Jr. et al teaches that abrasive-filled polymeric filaments will take a set shape, and unless the filaments of the tool recover, the tool becomes soft and loses it's effectiveness, column 1, lines 40-47, and that a bristle which is coated with abrasive has a higher [sic] initial bending modulus, a more constant bending [sic] modulus as a function of time, temperature, humidity and chemical environment, and higher tensile strength than an abrasive filled thermoplastic filament, column 2, lines 42-47. There is a reasonable expectation of success, in that Barber, Jr. et al coats plastic filaments. And the prior art combination teaches each and every claim limitation, as set forth in the final rejection. That applicant's method of making the product may vary in some process steps from the prior art is moot, as applicant has not provided evidence that one of ordinary skill would not find it obvious, given the teachings of Barber, Jr. et al to coat abrasive on the bristles, rather than intersperse abrasive throughout the bristle.

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This statement is made based on hindsight reasoning. Appellants have shown improved performance with the claimed article, as noted in Table III on page 15.

*Issue 2 Does the combination of Johnson, et al. (US Patent No. 5,679,067) and Barber, Jr., et al. (US Patent No. 5,518,794) teach the claimed invention as defined in Appellants' claims 1 and 3-13 under 35 USC § 103(a)?*

The products of the claimed invention, Barber, Jr., et al. and Johnson, et al., would be completely different in many respects. Barber, Jr., et al.'s abrasive coated bristles would require cutting abrasive coated filaments into segments, assembly of the cut filaments and adhesive or mechanical fastening to a core and would not result in a brush with a hub or body and bristles which are attached to the body or hub without adhesive bonding or mechanical fastening of bristles to the hub or body. Barber, Jr., et al.'s abrasive particles are adhered to the exterior of the core filaments, whereas Johnson, et al.'s abrasive particles are contained within the filaments, not on their surface. The present applicants' claims require that the article is a unitary brush comprised of a hub or body and bristles which are attached to the body or hub and are formed of the same mass of material as the hub or body without adhesive bonding or mechanical fastening of the bristles to the hub or body. The bristles are covered at least over a portion of the bristle surfaces with an adhesive coating which adheres the abrasive particles to the surface of the bristles.

Barber, Jr., et al. does not disclose utilizing a unitary brush having a hub or body and bristles which are attached to the hub or body and formed of the same mass of material as the hub or body without adhesive bonding or mechanical fastening of the bristles to the hub or body.

While Johnson, et al.'s bristles are attached by the same mass of material to a base, there is no indication that Johnson, et al. would want to apply the abrasive particles in a coating onto the surface of the bristles. Johnson, et al. fails to teach coating the bristles with additional binder so that additional abrasive grains may be applied. The teaching of Barber, Jr., et al., Johnson, et al. and the present claimed invention go in three different directions. One skilled in the art would not alter Barber, Jr., et al. by using the teaching of Johnson, et al. since that would be contrary to the teaching of each of these references. To be an appropriate combination of references, there

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must be some indication in the references that one skilled in the art would combine them. This is totally absent for the combination of Johnson, et al. and Barber, Jr., et al. Barber, Jr., et al. seek an abrasive article with abrasive coated filaments that are cut into segments and bound together on a hub. Johnson, et al. mold an abrasive article, not wanting abrasive coated filaments, but relying instead on abrasive particles contained within the molded filaments. By contrast, the present invention provides an abrasive brush wherein the hub and bristles are formed of the same mass of material without adhesive bonding or mechanical fastening. The bristles are coated at least in part with an adhesive coating to which abrasive particles are adhered. One skilled in the art would not alter Barber, Jr., et al. by the teaching of Johnson, et al. since it would be contrary to the teaching of each reference to make this combination.

In order for a *prima facie* case of obviousness to be established, the teachings from the prior art itself must appear to have suggested the claimed subject matter to one of ordinary skill in the art. See *In re Rinehart*, 531 F.2d 1048, 1051, 189 USPQ 143, 147 (CCPA 1976). The mere fact that the prior art could be modified as proposed by the Examiner is not sufficient to establish a *prima facie* case of obviousness. See *In re Fritch*, 972 F.2d 1260, 1266, 23 USPQ2d 1780, 1783 (Fed. Cir. 1992).

The motivation relied upon by the Examiner for combining the references so as to produce Appellants' claimed invention comes solely from the description of Appellants' invention in their specification. Thus, the Examiner used impermissible hindsight when rejecting the claims. See *W. L. Gore & Associates v. Garlock, Inc.*, 721 F.2d 1540, 1553, 220 USPQ 303, 312-313 (Fed. Cir. 1983), cert. denied, 469 U.S. 851 (1984); *In re Rothermel*, 276 F.2d 393, 396, 125 USPQ 328, 331 (CCPA 1960).

In view of these explanations, it is respectfully submitted that no valid suggestion can be identified in the prior art indicating to one of ordinary skill the possible desirability of combining the otherwise isolated features of the cited references in the manner proposed in the office action. *In re Deminski*, 796 F.2d 436, 230 USPQ 313 (Fed Cir 1986).

It is impermissible within the framework of section 103 to arbitrarily pick and choose from any one reference only so much as it will support a given position to the exclusion of other parts necessary to the full appreciation of what such reference fairly suggests to one of ordinary skill in

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the art. *In re Wesslau*, 147 USPQ 391, 391 (CCPA 1965). In the end, neither of the isolated references suggests the need or desirability of the combination proposed by the Examiner.



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CONCLUSION

For the foregoing reasons, appellants respectfully submit that the Examiner has erred in rejecting claims 1 and 3-13 of this application under 35 USC § 103(a). Please reverse the Examiner on all counts.

Respectfully submitted,

March 29, 2004

Date

By: 

Richard Francis, Reg. No.: 25,393

Telephone No.: (651) 733-7519

Office of Intellectual Property Counsel  
3M Innovative Properties Company  
Facsimile No.: 651-736-3833

**APPENDIX**

1. An article comprising:
  - (a) a unitary brush comprised of a hub or body and bristles which are attached to the body or hub and are formed of the same mass of material as the hub or body without adhesive bonding or mechanical fastening of bristles to the hub or body, the brush having a plurality of bristles, each bristle having a surface;
  - (b) a first coating of adhesive over at least a portion of at least some of the bristle surfaces; and
  - (c) a plurality of abrasive particles secured to at least a portion of at least some of the bristle surfaces via the first coating.
3. The article of claim 1 which further comprises a second coating coated over the abrasive particles and the first coating.
4. The article of claim 3 wherein the second coating is an adhesive.
5. The article of claim 1 wherein the abrasive particles are partially embedded in the first coating.
6. The article of claim 1 wherein the abrasive particles are selected from the group consisting of silicon carbide, talc, garnet, glass bubbles, glass beads, cubic boron nitride, diamond, and aluminum oxide.
7. The article of claim 1 wherein the first coating comprises a material selected from the group consisting of polyurethanes, epoxy resins, and acrylate resins.
8. The article of claim 3 wherein the second coating comprises a material selected from the group consisting of polyurethanes, epoxy resins, and acrylate resins.

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9. The article of claim 1 wherein the brush is selected from the group consisting of radial brushes and cup brushes.
10. The article of claim 1 wherein the bristles comprise a material selected from the group consisting of polyamide, polyester, and polyolefin.
11. The article of claim 1 wherein the bristles further comprise abrasive particles which are embedded within the bristles.
12. The article of claim 1 wherein said unitary brush is an injection molded brush.
13. An article comprising:
  - (a) an injection molded brush comprised of a hub or body and bristles which are attached to the body or hub and are formed of the same mass of material as the hub or body without adhesive bonding or mechanical fastening of bristles to the hub or body, the brush having a plurality of bristles, each bristle having a surface;
  - (b) a first coating of adhesive over at least a portion of at least some of the bristle surfaces; and
  - (c) a plurality of abrasive particles secured to at least a portion of at least some of the bristle surfaces via the first coating.

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<b>To:</b>	<b>Examiner Maurina T. Rachuba</b>
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<b>Location:</b>	Alexandria, VA
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